ORDER NO. SD7411-443

Service Manual

Technics STEREO Technics

MODEL SH-400

SPECIFICATIONS

Phono Input Sensitivity	1 ~ 5mV (SC/MAG)
Phono Input Impedance	2.2Kohm (Semi-condnctor)
	68Kohm (Magnetic Type)
Rated Output Level	200mV
Output Impedance	300ohm
Frequency Response	20 ~ 16,000Hz (Overall)
S/N Ratio	60dB
Channel Separation	55dB (Left-Right)
Power Supply PX, Europe	110, 125, 210, 240, 50/60Hz
Power Consumption	8W (PX, Europe)
Num of Semi-conductors	21C's, 2FET's, 39-Tr. 31-Dio.
Dimensions (W.H.D)	8"-1/16 x 5"-1/2" x 13"
	(205 x 140 x 330)
Weight	3.9Kg, 8Lbs 10oz.

Matsushita Electric Corp. of America
Matsushita Electric Corp. of Hawaii, Inc.
Matsushita Electric of Canada Ltd.

Matsushita Electric
Matsushita Electric Trading Co., Ltd.
P. O. Box 288, Central Osaka, Japan

LOCATIONS OF PARTS

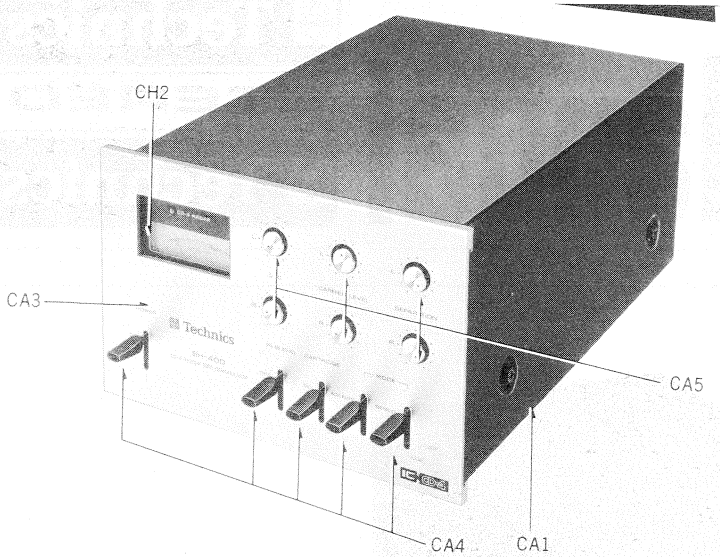


Fig. 1

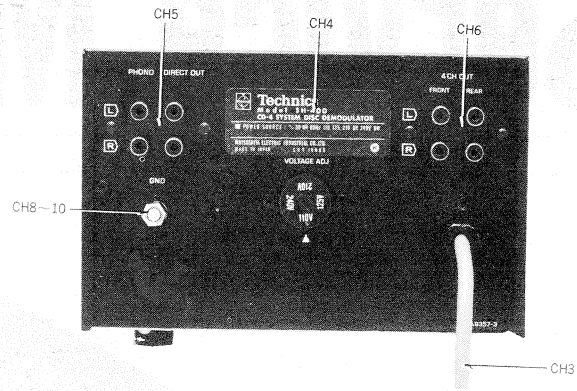


Fig. 2

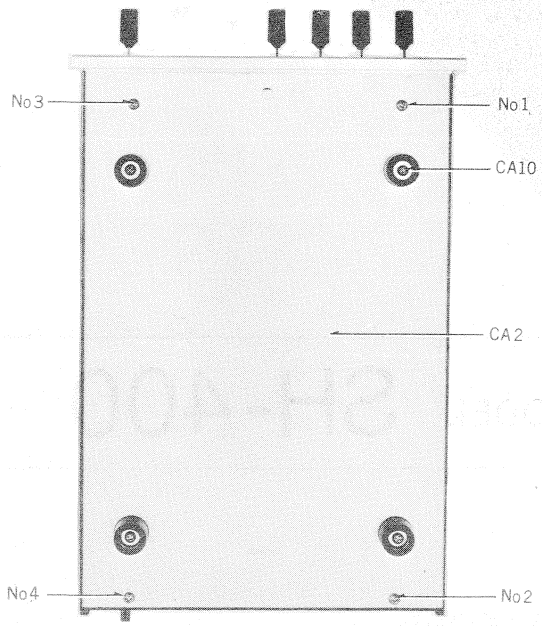


Fig. 3

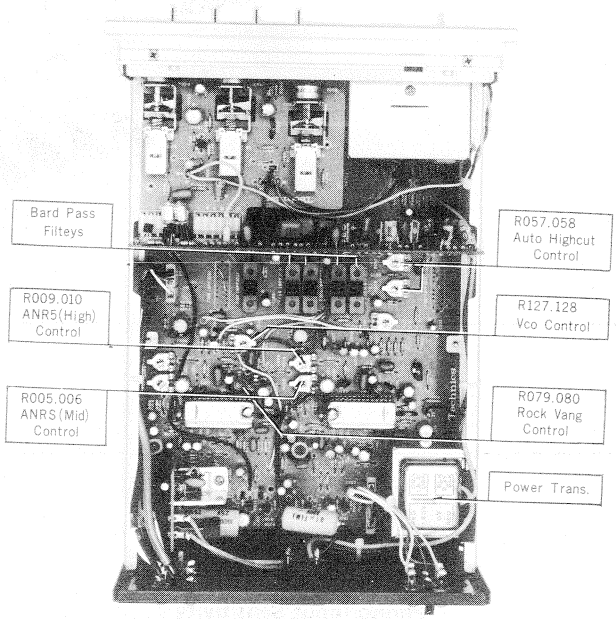


Fig. 4

DISASSEMBLY INSTRUCTIONS

TO REMOVE CHASSIS

1. Remove four (4) case holding screws.
2. Remove four (4) bottom plate holding screws.
3. Remove case and bottom plate in arrow direction

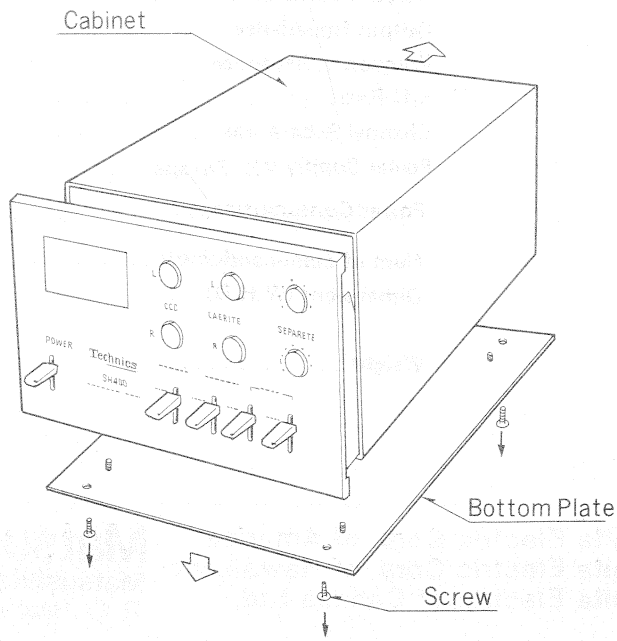


Fig. 5

ALIGNMENT INSTRUCTIONS

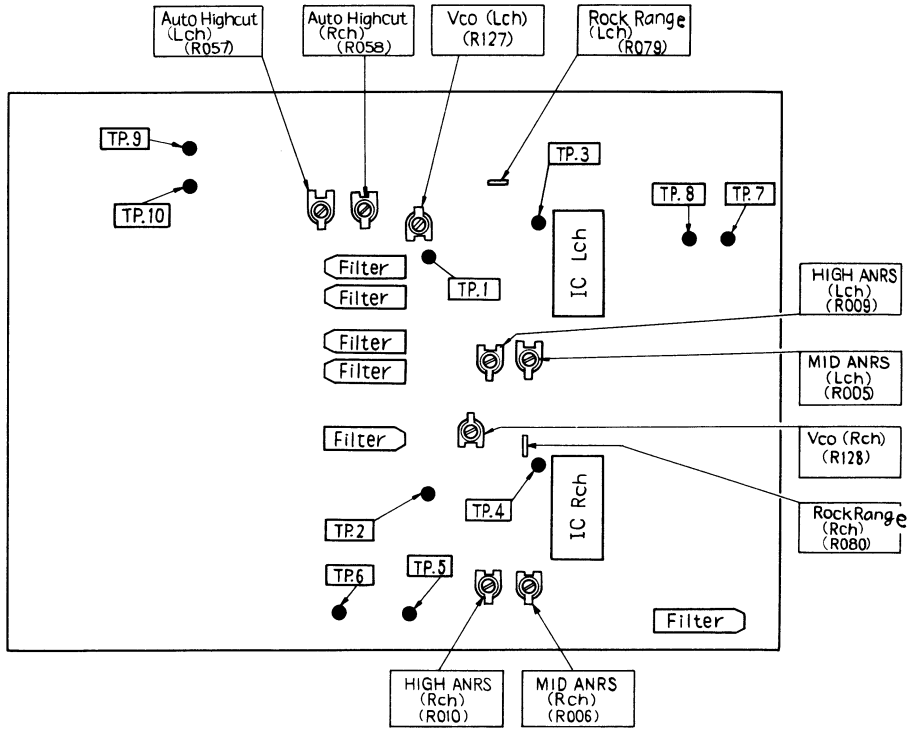


Fig. 6

FREE RUNNING FREQUENCY ALIGNMENT (Refer to Fig. 6)

* **L-Channel**

1 Connect to 22 of IC and earth through electrolytic capacitor (25V 10 μF)
Connect the negative pole of it to eacth.
2. Connect a Frequency Counter to the TP3 through resistor. (100Kohm)
3. Adjust 30KHz by 30KHz Adj. (R127)

* **R-Channel**

1. Connect to 22 of IC and earth through electrolytic capacitor (25V 10 μF)
Connect the negative pole of it to earth.
2. Connect a Frequency Counter to the TP4 through resistor. (100Kohm)
3. Adjust 30KHz by 30KHz Adj. (R128)

ROCK RANGE ALIGNMENT (Refer to Fig. 6 and Fig. 7)

* **Signal Generator**
Output: 1mV, 1KHz, 8KHz deviation signal

* **Oscilloscope**
Connect to the sub channel detector output.
L-channel C033–R027
R-channel C034–R028

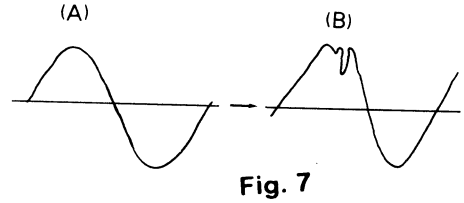


Fig. 7

* **L-Channel**

1. Connect the signal generator to the TP5 through electrolytic capacitor (25V10).
2. Connect the resistor (1Kohm) between the TP5 and the earth.
3. Adjust the output wave to the Fig. 7 (B) by the resistor (R079).

* **R-Channel**

1. Connect the signal generator to the TP6 through electrolytic capacitor (25V10)
2. Connect the resistor (1Kohm) between the TP6 and the earth.
3. Adjust the output wave to the Fig. 7 (B) by the resistor (R080)

* The resistors (R079, R080) must be moued from the maximum position to the minimum position.

AUTOMATIC NOISE REDUCTION SYSTEM ALIGNMENT (Refer to Fig. 6)

* **Signal generator**
  Output: 1mV, 30KHz, nonmodulated signal
* Connect the TP5 and the TP6 at the sametime.

A. MEDIUM ANRS

* Oscillator
  Output: 70mV, 630KHz

* **L-Channel**

1. Connect the signal generator to the TP5 through electrolytic capacitor (25V10).
2. Connect the oscillator to between C033 and R027.
3. Connect oscilloscope to the TP7.
4. Adjust 31 decibel down at the output by MID ANRS (R005) when the input signal goes down to 20 decibel.

* **R-Channel**

1. Connect the signal generator to the TP6 through electrolytic capacitor (25V10).
2. Connect the oscillator to between C034 and R028.
3 Connect oscilloscope to the TP8.
4. Adjust 31 decibel down at the output by MID ANRS (R006) when the input signal goes down to 20 decibel.

B. HIGH ANRS

* Oscillator
  Output: 500mV 15KHz

* **L-Channel**

1. Connect the signal generator to the TP5 through electrolytic capacitor (25V10).
2. Connect the oscillator to between C033 and R027
3. Connect oscilloscope to the TP7.
4. Adjust 32 decibel down at the output by HIGH ANRS (R009) when the input signal goes dowen to 20 decibel

* **R-Channel**

1. Connect the signal generator to the TP6 through electrolytic capacitor (25V10)
2. Connect the oscillator to between C034 and R028.
3. Connect oscilloscope to the TP8.
4 Adjust 32 decibel down at the output by HIGH ANRS (R010) when the input signal goes down to 20 decibel.

AUTO HIGH-CUT ALIGNMENT (Refer to Fig. 6)

* **Signal generator**
  Output: 5KHz, 1.3KHz deviation
  Output level is the point when the carrier input level (TP9 or TP10) becomes to 5mV.

* **L-Channel**

1. Connect the signal generator to the TP5 through electrolytic capacitor (25V10)
2. Connect oscilloscope to the TP7.
3. Down the output level of the signal generator to 3 decibel..
4. Adjust 3 decibel down from the first level at the output by R057.

* **R-Channel**

1. Connect the signal generator to the TP6 through electrolytic capacitor (25V10)
2. Connect oscilloscope to the TP8.
3. Down the output level of the signal generator to 3 decibel.
4. Adjust 3 decibel down from the first level at the output by R058.

BEFORE OPERATION

ADJUSTMENTS FOR SEPARATION, CARRIER LEVEL, C.C.C.

The following three adjustments should be made before operation

After making all connections, the following three adjustments should be made in order to assure the best performance of CD-4 records.

1. Separation adjustment
2. Adjustment of the carrier level (30 kHz level adjustment)
3. Adjustment of the carrier crosstalk canceller

In addition, these adjustments should also be made before this unit is used for the first time, if the cartridge of the record player is exchanged, if the stylus is exchanged, or if adjustments are accidentally disturbed.

Before adjustment:

(1) The 4-channel automatic/stereo selector ⑨ should be set to the "4CH AUTO" position, and the demodulate/direct selector ⑩ should be set to the "DEMOD" position.

(2) The cartridge selector ⑧ should be set to the position corresponding to the type of cartridge used on the record player.

SC:
Set to this position if a semi-conductor cartridge is used.

MAG:
Set to this position if a magnetic cartridge is used.

(3) The hi-blend switch ⑦ should be set to the "OFF" position.

(4) The carrier crosstalk canceller volume adjustment control pushbuttons ③, the carrier level volume adjustment control pushbuttons ④, and the separation volume adjustment control pushbuttons ⑤ should be set to the pushed (■→▬) position.

(5) Turn on the power switch ⑥.

Adjustment notes

(1) Be careful, when pushing inward (■→▬) the various pushbuttons, such as when completing the adjustment of the separation or the carrier level, that the pushbutton does not become turned. If it is accidentally turned, the best adjustment point may get out of position.

(2) Even if, after the adjustment is completed, these volume control pushbuttons are turned after they have been pushed inward, the best adjustment point will get out of position. Be absolutely sure never to turn them, therefore,after they have been pushed inward.

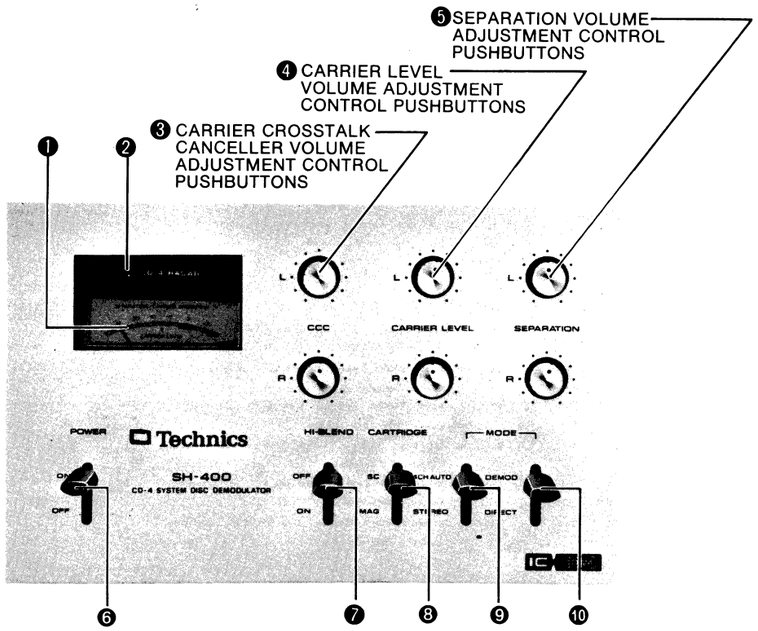
(3) You can turn down the volume of the amplifier or the receiver for the adjustment of the record but since you can use the "adjustment meter"① of the unit, you need not turn down the volume.

HOW TO MAKE ADJUSTMENTS

Order of adjustment

· Be sure to make adjustments in the following order:

1. Separation, 2. carrier level, 3. carrier crosstalk canceller.



1. Separation adjustment

(1) Push the left (L) and right (R) carrier level volume adjustment control pushbuttons ④ to the released (▬→■) position, turn them both completely clockwise, and then push them both inward again (■→▬).

(2) Left channel adjustment

- Push only the left (L) separation volume adjustment control pushbutton ⑤ to the released (▬→■) position.
- When playing the separation adjustment signal on side A of the test record (included with this unit), turn the left (L) separation volume adjustment control pushbutton ⑤ to the left and right to find the setting at which the indicator needle of the adjustment meter ① moves as far as it will go to the left (the minimum position).
- After this adjustment, push the volume adjustment control pushbutton inward (■→▬).

(3) Right channel adjustment

- Push only the right (R) separation volume adjustment control pushbutton ⑤ to the released (▬→■) position.
- In the same way as for the left channel adjustment, play the signal for separation adjustment. Then turn the right (R) separation volume adjustment control pushbutton to the left or right to find the setting at which the indicator needle of the adjustment meter ① moves as far as it will go to the left (the minimum position).
- After this adjustment, push the volume adjustment control pushbutton inward (■→▬).

This finishes the adjustments of the separation.

2. Carrier level adjustment (30 kHz level adjustment)

(1) Left channel adjustment

- Push only the left (L) carrier level volume adjustment control pushbutton ④ to the released (▬→■) position.
- While playing the carrier level adjustment signal on side A of the test record (included with this unit), turn the left (L) carrier level volume adjustment control pushbutton ④ to the left or right to find the setting at which the indicator needle of the adjustment meter ① moves to the position as shown on the right photo.
- After finishing this adjustment, push the volume pushbutton inward (■→▬).

(2) Right channel adjustment

- Push only the right (R) carrier level volume adjustment control pushbutton ④ to the released (▬→■) position.
- In the same way as for the left channel adjustment, play the signal for performing adjustment of the carrier level. Then turn the right (R) carrier level volume adjustment control pushbutton to the left or right and adjust so that the indicator needle of the adjustment meter ① moves to the position shown in figure below.
- After this adjustment, push the volume control pushbutton inward (■→▬).

This finishes the adjustments of the carrier level.

3. Carrier crosstalk canceller (C.C.C.) adjustment

(1) Left channel adjustment

- Pushing only the left (L) carrier crosstalk canceller volume adjustment control pushbutton ③ to the released (▬→■) position.
- While playing the carrier crosstalk canceller adjustment signal on side A of the test record, turn the left carrier crosstalk canceller volume adjustment control pushbutton ③ to the left or right to find the setting at which the indicator needle of the adjustment meter ① moves as far as it will go to the left (the minimum position).
- After finishing the adjustment, push the volume adjustment control pushbutton inward (■→▬).

(2) Right channel adjustment

- Push only the right (R) carrier crosstalk canceller volume adjustment control pushbutton ③ to the released (▬→■) position.
- In the same way as for the left channel adjustment, play the signal for adjustment of the carrier crosstalk canceller. Then turn the right (R) carrier crosstalk canceller volume adjustment control pushbutton to the left and right in order to determine the setting at which the indicator needle moves as far as possible to the left (the minimum position).
- After finishing this adjustment, push the volume adjustment control pushbutton inward (■→▬).

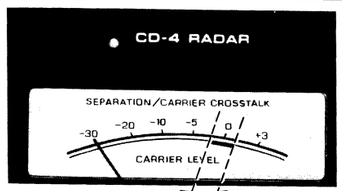
This finishes the adjustments of the carrier crosstalk canceller.

(Notes) When adjusting the carrier crosstalk canceller volume adjustment control pushbuttons, the following conditions may occur. These, however, do not indicate that the unit is out of order.

(1) The indicator needle of the adjustment meter ① may fluctuate slightly because of the characteristic of the cartridge which is used.

(2) Depending upon the characteristic of the cartridge which is used, the fluctuation of the indicator needle of the adjustment meter ①, and thus the adjustment position, may be different for the left and right sides.

(3) While turning the carrier crosstalk canceller volume adjustment control pushbuttons ③, the indication needle of the adjustment meter ① may fluctuate to the right side first, before then fluctuating to the left side.



The indicator needle should move within this range.

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crosstalk can-

1. Separation adjustment

(1) Push the left (L) and right (R) carrier level volume adjustment control pushbuttons ④ to the released (▬→▮) position, turn them both completely clockwise, and then push them both inward again (▮→▬).

(2) Left channel adjustment

- Push only the left (L) separation volume adjustment control pushbutton ⑤ to the released (▬→▮) position.
- When playing the separation adjustment signal on side A of the test record (included with this unit), turn the left (L) separation volume adjustment control pushbutton ⑤ to the left and right to find the setting at which the indicator needle of the adjustment meter ① moves as far as it will go to the left (the minimum position).
- After this adjustment, push the volume adjustment control pushbutton inward (▮→▬).

(3) Right channel adjustment

- Push only the right (R) separation volume adjustment control pushbutton ⑤ to the released (▬→▮) position.
- In the same way as for the left channel adjustment, play the signal for separation adjustment. Then turn the right (R) separation volume adjustment control pushbutton to the left or right to find the setting at which the indicator needle of the adjustment meter ① moves as far as it will go to the left (the minimum position).
- After this adjustment, push the volume adjustment control pushbutton inward (▮→▬).

This finishes the adjustments of the separation.

2. Carrier level adjustment (30 kHz level adjustment)

(1) Left channel adjustment

- Push only the left (L) carrier level volume adjustment control pushbutton ④ to the released (▬→▮) position.
- While playing the carrier level adjustment signal on side A of the test record (included with this unit), turn the left (L) carrier level volume adjustment control pushbutton ④ to the left or right to find the setting at which the indicator needle of the adjustment meter ① moves to the position as shown on the right photo.
- After finishing this adjustment, push the volume pushbutton inward (▮→▬).

(2) Right channel adjustment

- Push only the right (R) carrier level volume adjustment control pushbutton ④ to the released (▬→▮) position.
- In the same way as for the left channel adjustment, play the signal for performing adjustment of the carrier level. Then turn the right (R) carrier level volume adjustment control pushbutton to the left or right and adjust so that the indicator needle of the adjustment meter ① moves to the position shown in figure below.
- After this adjustment, push the volume control pushbutton inward (▮→▬).

This finishes the adjustments of the carrier level.

3. Carrier crosstalk canceller (C.C.C.) adjustment

(1) Left channel adjustment

- Pushing only the left (L) carrier crosstalk canceller volume adjustment control pushbutton ③ to the released (▬→▮) position.
- While playing the carrier crosstalk canceller adjustment signal on side A of the test record, turn the left carrier crosstalk canceller volume adjustment control pushbutton ③ to the left or right to find the setting at which the indicator needle of the adjustment meter ① moves as far as it will go to the left (the minimum position).
- After finishing the adjustment, push the volume adjustment control pushbutton inward (▮→▬).

(2) Right channel adjustment

- Push only the right (R) carrier crosstalk canceller volume adjustment control pushbutton ③ to the released (▬→▮) position.
- In the same way as for the left channel adjustment, play the signal for adjustment of the carrier crosstalk canceller. Then turn the right (R) carrier crosstalk canceller volume adjustment control pushbutton to the left and right in order to determine the setting at which the indicator needle moves as far as possible to the left (the minimum position).
- After finishing this adjustment, push the volume adjustment control pushbutton inward (▮→▬).

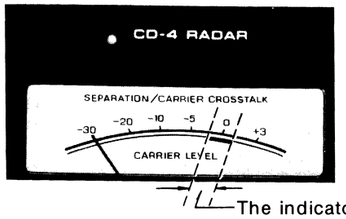
This finishes the adjustments of the carrier crosstalk canceller.

(Notes) When adjusting the carrier crosstalk canceller volume adjustment control pushbuttons, the following conditions may occur. These, however, do not indicate that the unit is out of order.

(1) The indicator needle of the adjustment meter ① may fluctuate slightly because of the characteristic of the cartridge which is used.

(2) Depending upon the characteristic of the cartridge which is used, the fluctuation of the indicator needle of the adjustment meter ①, and thus the adjustment position, may be different for the left and right sides.

(3) While turning the carrier crosstalk canceller volume adjustment control pushbuttons ③, the indication needle of the adjustment meter ① may fluctuate to the right side first, before then fluctuating to the left side.



The indicator needle should move within this range.

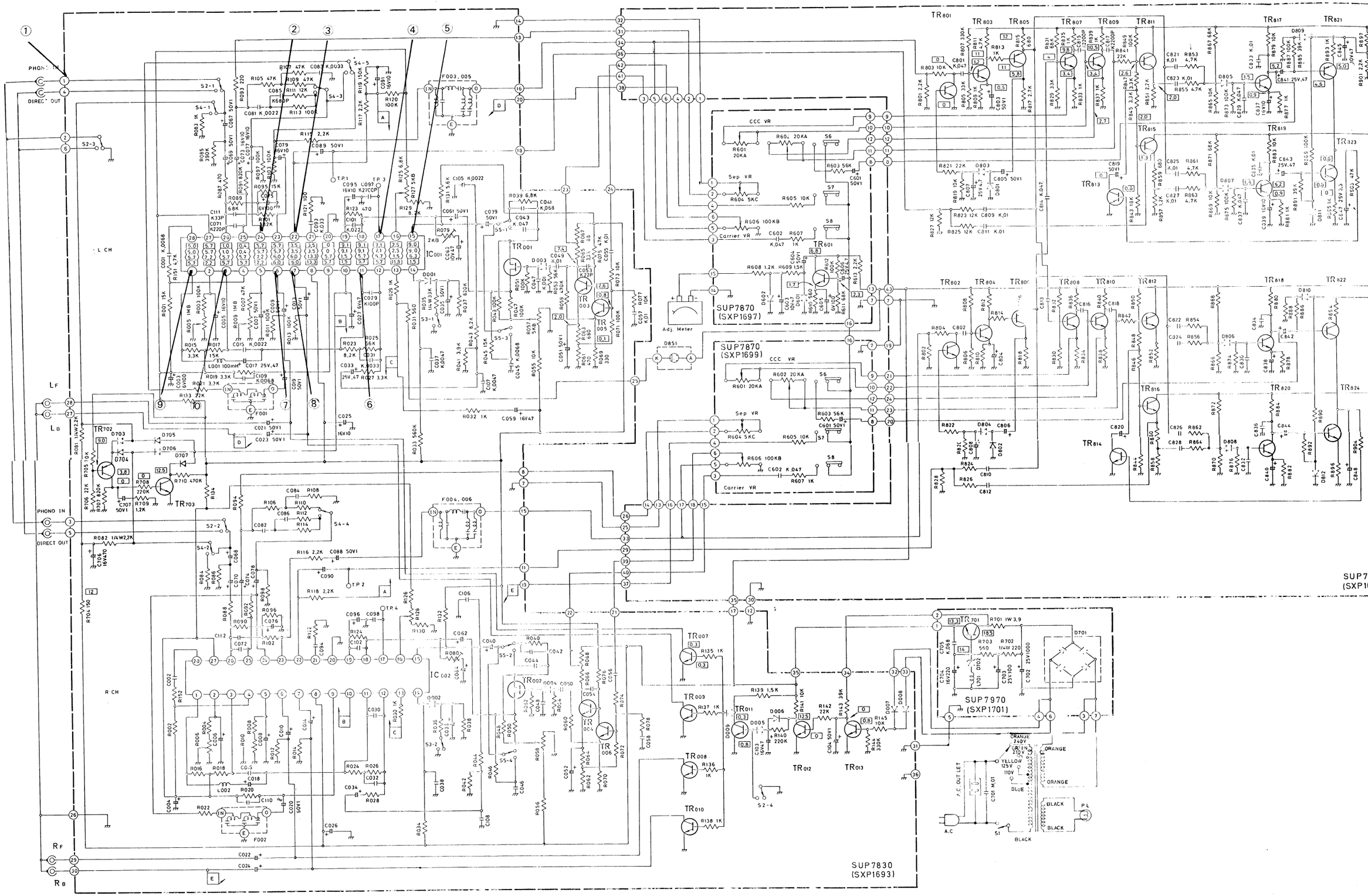
TROUBLESHOOTING GUIDE

Any "trouble" which might be noted in a system including the CD-4 system can usually be traced to the record, the cartridge, the turntable, the demodulator, or the connections between these, or to the manner in which one or all of these are operated. Even though the symptom seems to indicate the fault to be in one component, careful examination often shows it to be elsewhere, or to be an outside cause, or indeed due to incorrect operation. In addition, sound reproduction becomes ever more faithful to the original as improvements are made in the manufacture of high fidelity components, making the listener ever more conscious of noise which, until recently, was "hidden" within the music itself. The following table can be successfully used to locate the cause, and provide the corresponding remedy, of many of the problems which may be encountered.

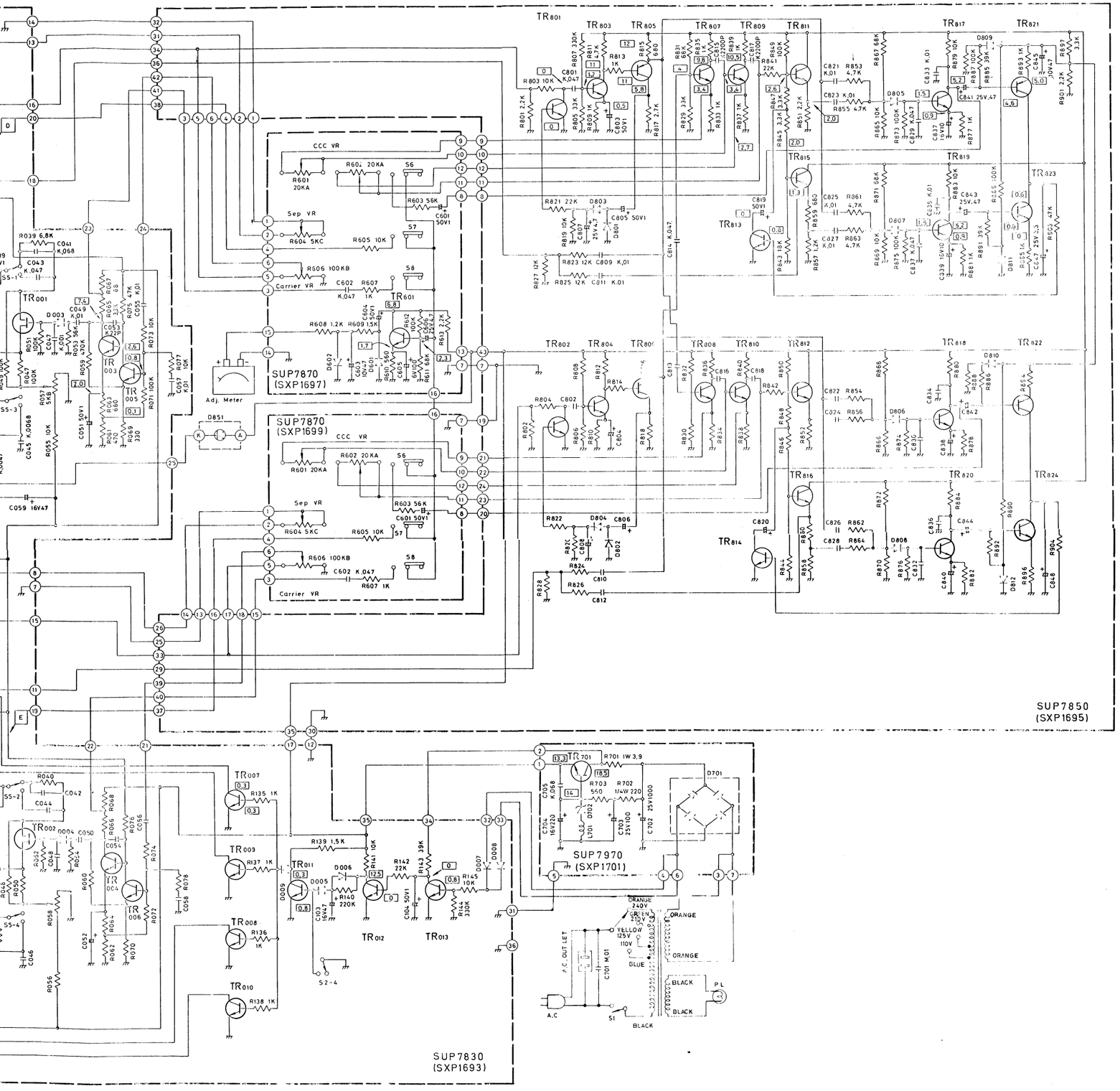
Symptom	Main cause	Remedy
• Abnormal noise Noise is heard at the "4CH AUTO" position but not at the "STEREO" position during performance of a discrete 4-channel record.	• The stylus is worn out.	• The stylus can be used for 300 to 400 hours. If used longer, noise is apt to increase and, moreover, the record may be damaged. It should be replaced with a new one.
	• There is dust on the record or on the tip of the stylus.	• Any dust on the surface of the record is apt to interfere with satisfactory reproduction. Be sure, therefore, to clean away dust completely, using a cleaner or other effective method. To remove dust from the tip of the stylus.
• Abnormal noise, continually or intermittently. • Left/right sound separation is unsatisfactory.	• The demodulator of the CD-4 system is located near a television set.	• Maintain a distance of more than 2 feet between the demodulator and the television set.
	• Stylus pressure is incorrect.	• Be sure that the stylus pressure is set to the position specified for the cartridge.
• Noise (hum) is heard continually between record performances.	• The ground wire from the turntable isn't connected correctly.	• Connect the ground wire from the turntable to the GND terminal of this unit.
• There is distortion in the sound, or unusual vibration.	• The stylus pressure is incorrect.	• Be sure that the stylus pressure is set to the specified pressure for the cartridge.
	• There is dust on the record or on the tip of the stylus.	• Dust on the record should be removed with the cleaner. Dust on the tip of the stylus should be removed with the cleaner.
	• The stylus tip is worn.	• The stylus can be used for 300 to 400 hours. If used longer, noise is apt to increase and, moreover, the record may be damaged. It should be replaced with a new one.
• Front/rear separation is unsatisfactory.	• The stylus pressure is incorrect.	• Be sure that the stylus pressure is set to the specified pressure for the cartridge.
	• The cartridge phase is reversed.	• Please confirm that the "L", "R" of the lead wire is properly connected to the cartridge.
	• The record or the stylus is dirty.	• Use the cleaner to remove dust from the record; use the cleaner to remove dust on the tip of the stylus.

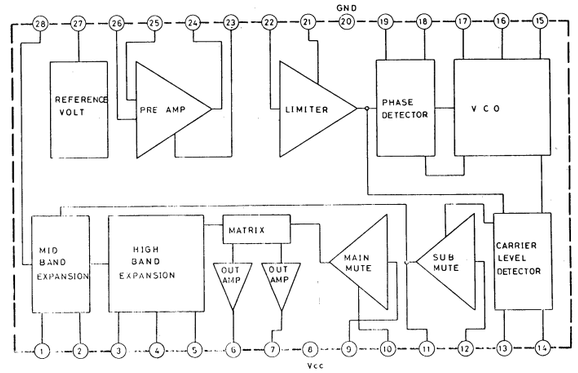
The term CD-4 record used in these operating instructions refers to any discrete 4-channel record including those labeled "Quadradisc (RCA, WEA, PROJECT 3, etc.)" "CD-4," etc.

SCHEMATIC DIAGRAM MODEL SH-400



400





IC 001, 002

TRANSISTORS

TR 001, 002	2SK30
TR 003-013, 601, 703, 801-804 807-820, 823, 824	2SC828
TR 702, 805, 806, 821, 822	2SA564
TR 701	2SC1226A

DIODES

D 001, 002, 005-008, 703-707	MA150
D 003, 004, 601, 801-808	OA90
D 602, 809-812	SVDMA26-1
D 701	SVDS1RB10
D 702	SVDMZ214A
D 851	SVDLN23
D 009	SVDMA26-2

IC'S

IC 001, 002	QS15022

NOTES

1. —◯— Corresponds to the number on the printed wiring boards.
2. DC Voltage measurements are taken with a circuit Tester. (100 K Ω/V) from chasis ground.
   □ Shows the Voltage without any signal.
   ( ) Shows the Voltage with CD-4 signal.
3. Tolerance K ± 10% M ± 20% J ± 5% P ± 0 - + 100%

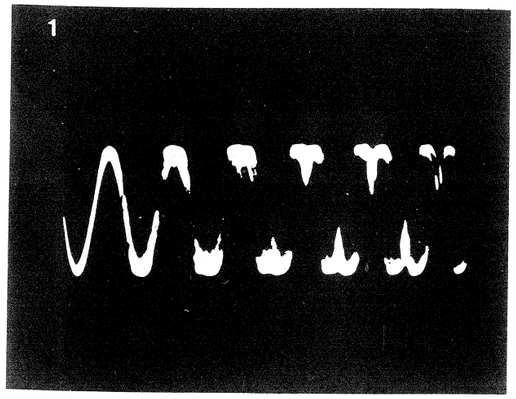
SWITCHES

S1	Power Switch now in OFF position moves OFF → ON
S2-1, S2-3	Mode Switch now in Demodu position moves Demodu → Direct
S3-1, 3-2	Mode Switch now in 4ch Auto position moves 4ch Auto → 2ch
S4-1-4-5	Cartridge Selector Switch now in SC position moves SC → Mag.
S5-1-5-4	High-Blend switch now in OFF position moves OFF → ON
S6-8	Meter Selector Switch now in OFF position moves OFF → ON

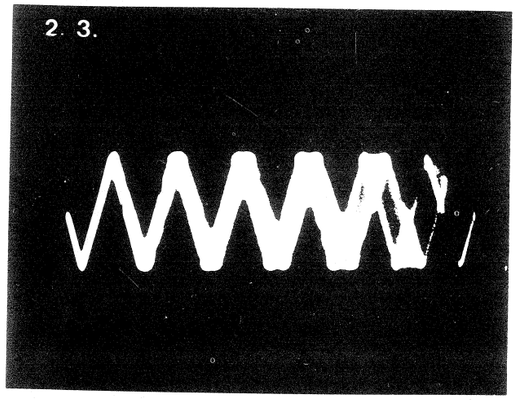
This schematic diagram might be modified with the development of technology.

Note : ◯ ... Test point for waveform with CD-4 Adjustment Signal Generator.

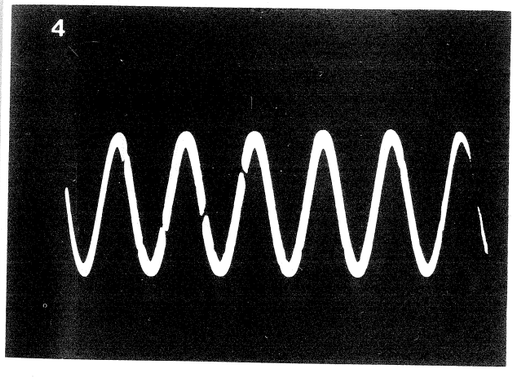
STANDARD WAVEFORMES AND VOLTAGE WITH CD-4 ADJUSTMENT SIGNAL GENERATOR



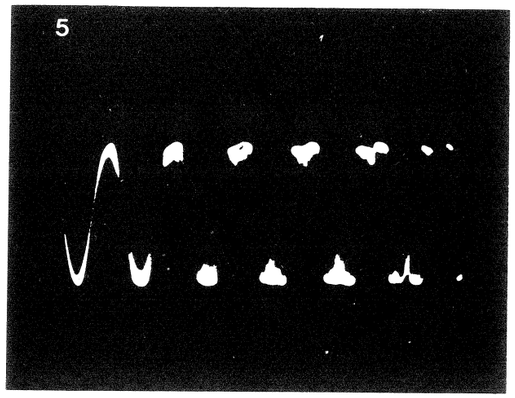
1. Note: Phono Input signal. (AC Level 3mV, 20μsec)



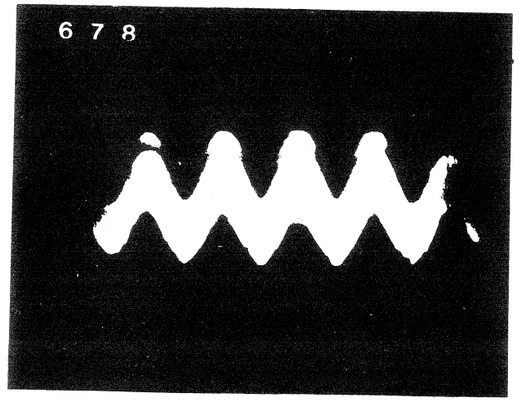
2. Note: Subchannel Out (AC level 490mV, 20μsec)
3. Note: Limitter Input (AC Level 190mV, 20μsec)



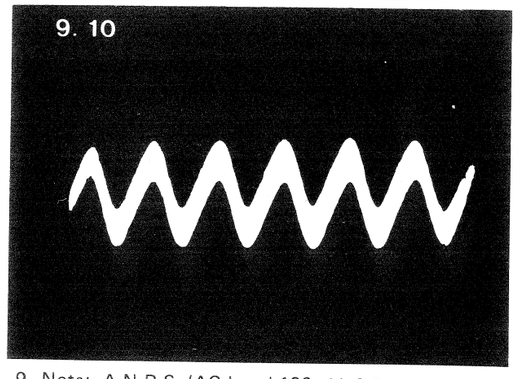
4. Note: Vco (AC Level 420mV, 20μsec)



5. Note: Detector Out (AC Level 21mV, 0.5msec)



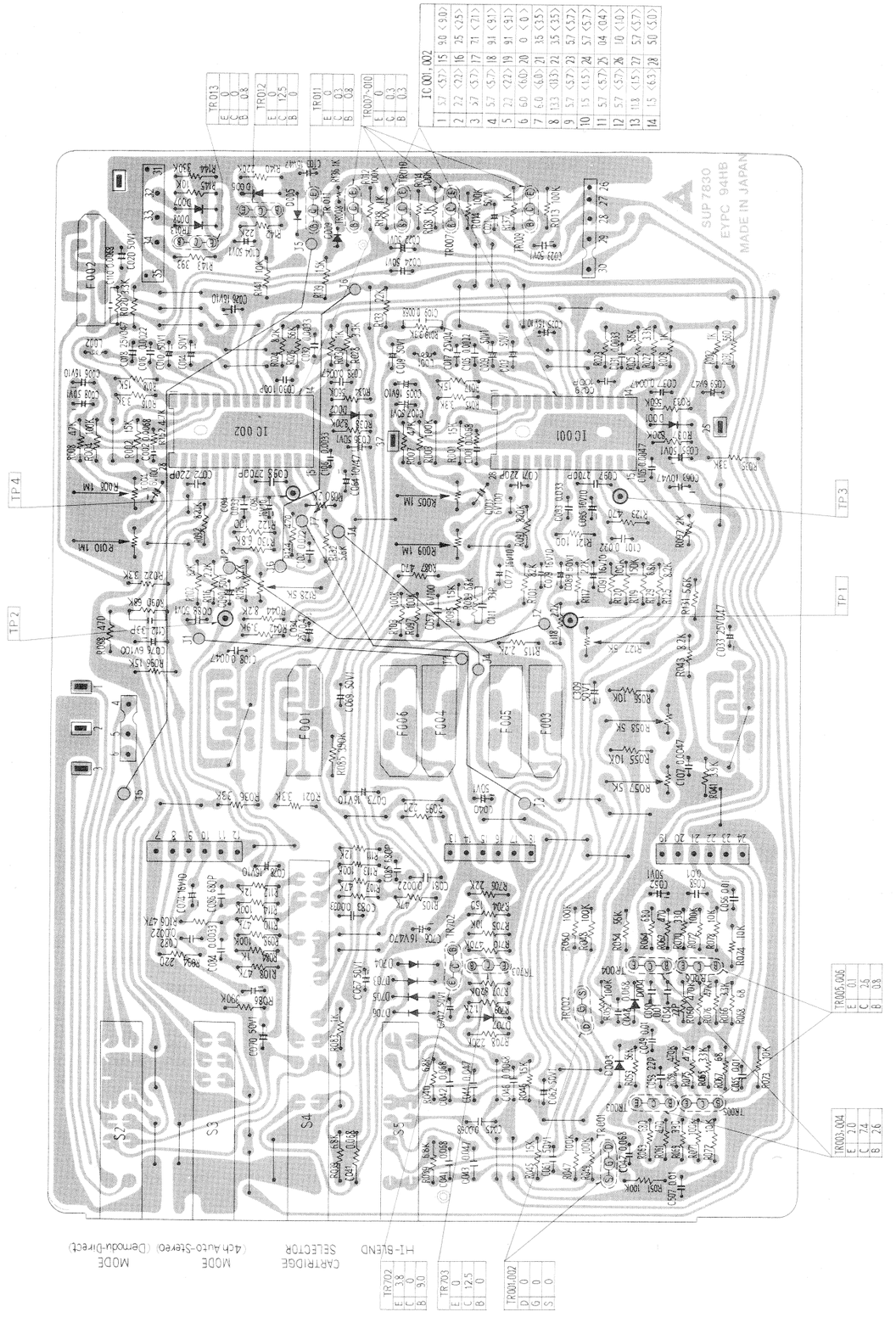
6. Note: FM-PM Out (AC Level 210mV, 0.5msec)
7. Note: Matrix Out (AC Level 160mV, 0.5msec)
8. Note: Matrix Out (AC Level 160mV. 0.5msec)



9. Note: A.N.R.S. (AC Level 190mV. 0.5msec)
10. Note: A.N.R.S. (AC Level 40mV, 0.5msec)

CIRCUIT BOARD CD-4 DEMODULATOR

C.C.C.



METER AM

POWER PR

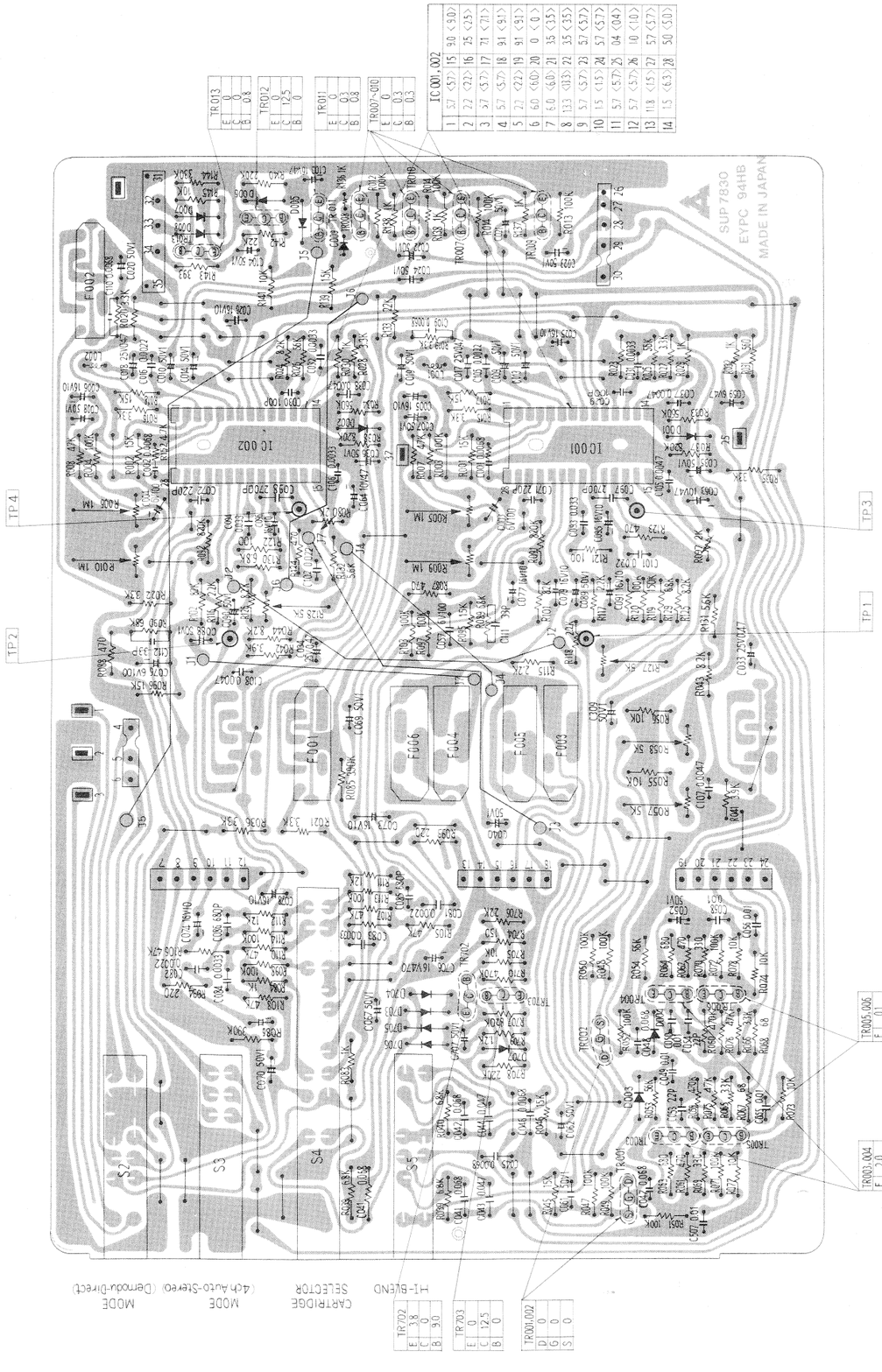
STMENT

msec)

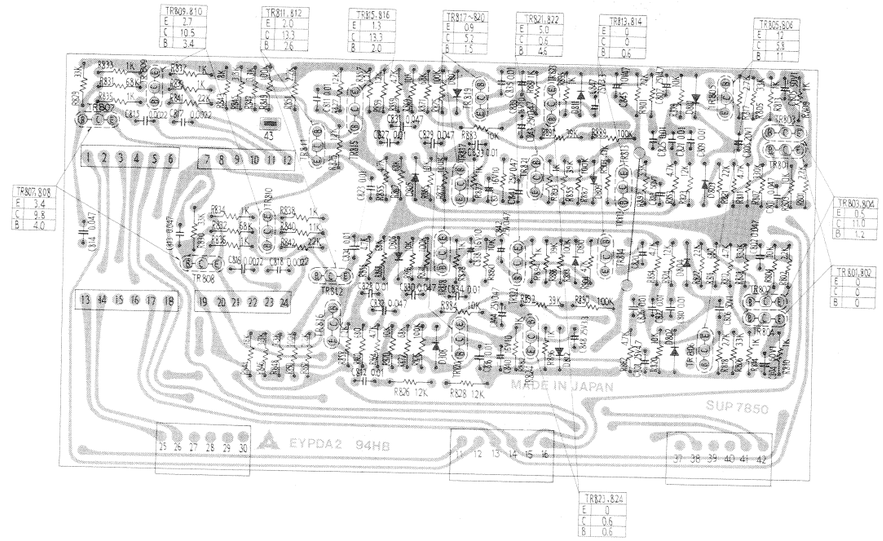
nsec)
sec)
sec)

ec)
c)

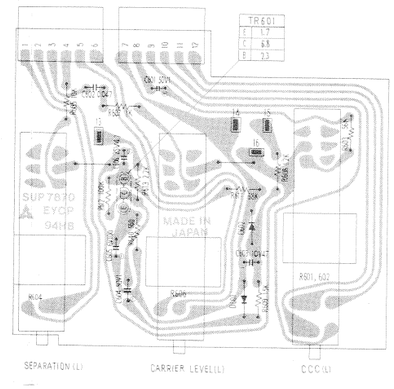
CIRCUIT BOARD CD-4 DEMODULATOR

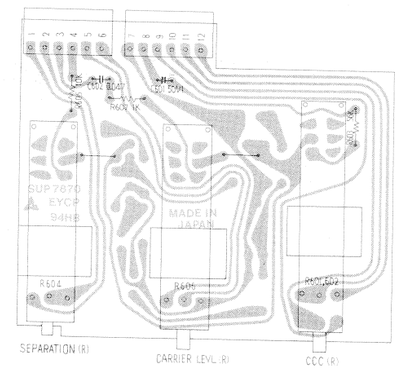


C.C.C.

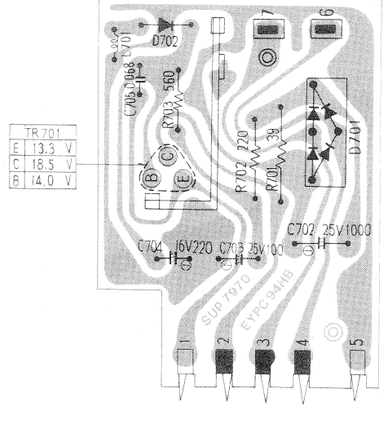


METER AMP

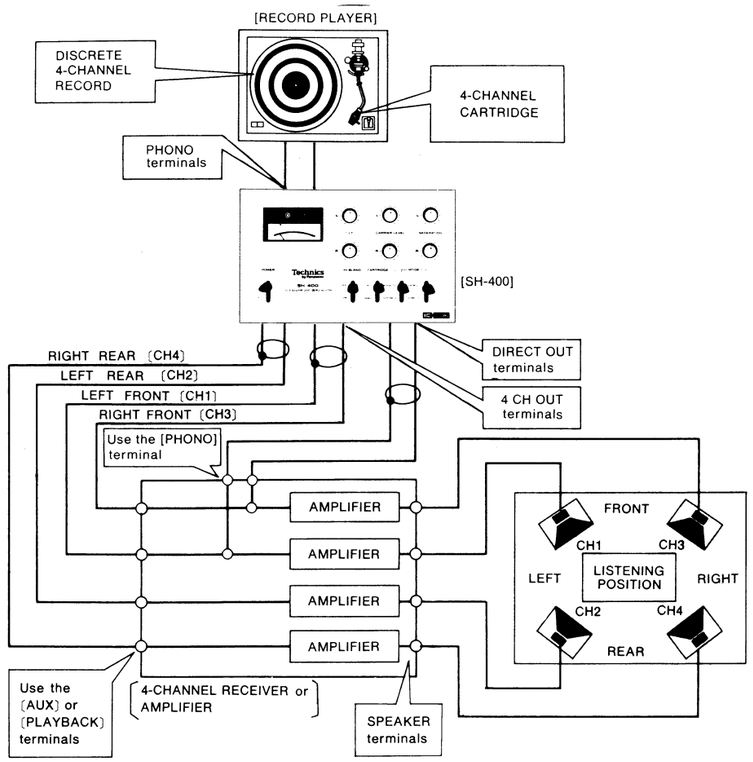




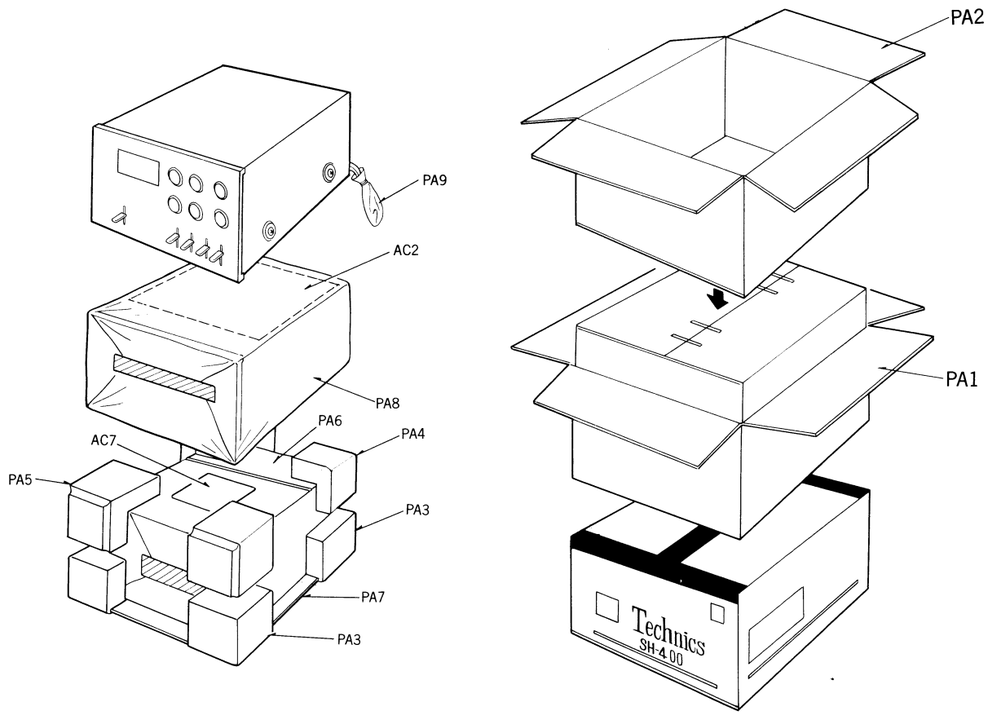
POWER PROTECTION



CONNECTIONS FOR A CD-4 SYSTEM



COMPONENT PACKING PROCEDURE



REPLACEMENT PARTS LIST

Ref. No.	Part No.	Description	Per Set (PCS.)	Remarks
IC and TRANSISTORS				
IC001,002	SVIQS5022	Demodulator	2	
TR001,002	2SK30AY	Auto highcut	2	
TR003-006	2SC828-RST	Auto highcut	4	
TR007-010	2SC828-RST	Muting	4	
TR011	2SC828-RST	Muting	1	
TR012,013	2SC828-RST	Muting	2	
TR601	2SC828-RST	Meter Amp.	1	
TR701	A2SC1226-PQR	Ripple Filter	1	
TR702	2SA564-QR	Muting	1	
TR703	2SC828-RST	Muting	1	
TR801,802	2SC828-RST-	C.C.C.	2	
TR803,804	2SC828-RST	C.C.C.	2	
TR805,806	2SA564-QR	C.C.C.	2	
TR807,808	2SC828-RST	C.C.C.	2	
TR809,810	2SC828-RST	C.C.C.	2	
TR811,812 815,816	2SC828-RST	C.C.C.	4	
TR813,814	2SC828-RST	C.C.C.	2	
TR817-820	2SC828-RST	C.C.C	4	
TR821,822	2SA564-QR	C.C.C.	2	
TR823,824	2SC828-RST	C.C.C.	2	
DIODES				
D001,002, 005–008 703–707	MA150	Demodulator	11	
D003,004	OA90	Demodulator	2	
D009	MA26-2	Demodulator	1	
D601	OA90	Rectifier	1	
D602	MA26-1	Rectifier	1	
D701	SVDS1RB10	Rectifier	1	
D702	SVDMZ214A	Stabilizer	1	
D801–804	OA90	C.C.C.	4	
D805–808	OA90	C.C.C.	4	
D809–812	MA26-1	C.C.C.	4	
D851	LN23	CD-4 Radar, L.E.D.	1	○
COILS and TRANSFORMER				
L001,002	SLQR104-1K	Choke Coil	2	N
L701	SLQX250-1	Choke Coil	1	
T801	SLT5K43	Power Transformer	1	○
			1	
RESISTORS				
R001,002,017, 018,045,046, 095,096	ERD18TJ153	15KΩ 1/8W ±5% Carbon	8	
R003,004,011– 014,047–052 071,072,097 098,103,113, 114,120	ERD18TJ104	100KΩ 1/8W ±5% Carbon	20	
R007,008,075, 076,105–110	ERD18TJ473	47KΩ 1/8W ±5% Carbon	10	
R015,016,021 022,027,028 065,066	ERD18TJ332	3.3KΩ 1/8W ±5% Carbon	8	
R019,020,845- 848,897	ERD18TJ332	3.3KΩ 1/8W ±5% Carbon	7	
R023,024,043, 044,125,126	ERD18TJ822	8.2KΩ 1/8W ±5% Carbon	6	
R025,026,053, 054	ERD18TJ563	560KΩ 1/8W ±5% Carbon	4	
R029,030,032, 083,084,135, 137,138	ERD18TJ102	1KΩ 1/8W ±5% Carbon	8	
R031	ERD18TJ561	560Ω 1/8W ±5% Carbon	1	
R033,034	ERD18TJ564	560KΩ 1/8W ±5% Carbon	2	
R035	ERD14TJ333	33KΩ 1/4W ±5% Carbon	1	
R036	ERD18TJ333	33KΩ 1/8W ±5% Carbon	1	
R037,038,091, 092,707	ERD18TJ824	820KΩ 1/8W ±5% Carbon	5	
R039,040,129, 130	ERD18TJ682	6.8KΩ 1/8W ±5% Carbon	4	
R041,042	ERD18TJ392	3.9KΩ 1/8W ±5% Carbon	2	
R055,056,073, 074,077,078 141,145,705	ERD18TJ103	10KΩ 1/8W ±5% Carbon	9	
R059,060710	ERD18TJ474	470KΩ 1/8W ±5% Carbon	3	
R061,062,087, 088,123,124	ERD18TJ471	470Ω 1/8W ±5% Carbon	6	
R063,064	ERD18TJ681	680Ω 1/8W ±5% Carbon	2	
R067,068	ERD18TJ680	68Ω 1/8W ±5% Carbon	2	
R069,070	ERD18TJ331	330Ω 1/8W ±5% Carbon	2	
R081,082	ERD14TJ222	2.2KΩ 1/4W ±5% Carbon	2	
R085,086	ERD18TJ394	390KΩ 1/8W ±5% Carbon	2	
R089,090	ERD18TJ683	68KΩ 1/8W ±5% Carbon	2	
R093,094	ERD18TJ221	220Ω 1/8W ±5% Carbon	2	
R101,102	ERD18TJ823	82KΩ 1/8W ±5% Carbon	2	
R111,112	ERD18TJ123	12KΩ 1/8W ±5% Carbon	2	
R115–118	ERD18TJ222	2.2KΩ 1/8W ±5% Carbon	4	
R119	ERD18TJ154	150KΩ 1/8W ±5% Carbon	1	
R121,122	ERD18TJ101	100Ω 1/8W ±5% Carbon	2	
R131,132	ERD18TJ562	5.6KΩ 1/8W ±5% Carbon	2	
R133,134,142 706	ERD18TJ223	22KΩ 1/8W ±5% Carbon	4	
R136,607x2, 809,810,813, 814,833–840 877,878,881, 882,893–896	ERD18TJ102	1KΩ 1/8W ±5% Carbon	23	
R139	ERD18TJ152	1.5KΩ 1/8W ±5% Carbon	1	
R140,708	ERD18TJ224	220KΩ 1/8W ±5% Carbon	2	
R143	ERD18TJ393	39KΩ 1/8W ±5% Carbon	1	
R144	ERD18TJ334	330KΩ 1/8W ±5% Carbon	1	
R151,152,811, 812,853–856 861–864	ERD18TJ472	4.7KΩ 1/8W ±5% Carbon	12	
R603x2	ERD18TJ563	56KΩ 1/8W ±5% Carbon	2	
R605x2,803 804,819,820, 865,866,869, 870,879,880, 883,884	ERD18TJ103	10KΩ 1/8W ±5% Carbon	14	
R608,857,858	ERD18TJ122	1.2KΩ 1/8W ±5% Carbon	3	
R609	ERD18TJ152	1.5KΩ 1/8W ±5% Carbon	1	
R610	ERD18TJ561	560Ω 1/8W ±5% Carbon	1	
R611,831,832, 867,868,871, 872	ERD18TJ683	68KΩ 1/8W ±5% Carbon	7	
R612,849,850, 873–876, 887–890	ERD18TJ104	100KΩ 1/8W ±5% Carbon	11	
R613	ERD18TJ222	2.2KΩ 1/8W ±5% Carbon	1	
R701	ERX1ANJ3R9	3.9Ω 1W ±5% Metallic Film	1	
R702	ERD14TJ221	220Ω 1/4W ±5% Carbon	1	
R703	ERD18TJ561	560Ω 1/8W ±5% Carbon	1	
R704	ERD18TJ151	150Ω 1/8W ±5% Carbon	1	
R709	ERD18TJ122	1.2KΩ 1/8W ±5% Carbon	1	
R801,802,851, 852,901	ERD18TJ222	2.2KΩ 1/8W ±5% Carbon	5	
R805,806,829, 830	ERD18TJ333	33KΩ 1/8W ±5% Carbon	4	
R807,808	ERD18TJ334	330KΩ 1/8W ±5% Carbon	2	
R815,816,859, 860	ERD18TJ681	680Ω 1/8W ±5% Carbon	4	
R817, 818	ERD18TJ272	2.7KΩ 1/8W ±5% Carbon	2	
R821,822,841 842	ERD18TJ223	22KΩ 1/8W ±5% Carbon	4	
R823–828	ERD18TJ123	12KΩ 1/8W ±5% Carbon	6	
R843,844	ERD18TJ183	18KΩ 1/8W ±5% Carbon	2	
R885,886,891 892	ERD18TJ393	39KΩ 1/8W ±5% Carbon	4	
R903,904	ERD18TJ473	47KΩ 1/8W ±5% Carbon	2	
CAPACITORS				
C001,002,045, 046,109,110	ECQM05682KZ	0.0068μF 50V ±10% Polyester	6	
C003,004,075 076	ECEA6V100LF	100μF 6V ±10% Electrolytic	4	

Ref. No.	P
C005,006,025 026,073,074 077–079, 091,095,096	ECEA
C007–010,013, 014,019–024 035,036,039, 040,051,052 061,062,067- 070,088,089, 090,104,707	ECEA
C015,016,081 082	ECQM
C017,018,033 034	ECAG
C020	ECEA
C027	ECEA
C029,030	ECCC
C031,032,083, 084,106	ECQM
C037,038,105 107,108	ECQM
C041,042,047, 048	ECQM
C043,044, 602x2,801, 802,813,814 829–832	ECQM
C049,050,055– 058,809–812 821–828, 833–836	ECQM
C053,054	ECCC
C059,103	ECEA
C063,064	ECEA
C071,072	ECCC
C085,086	ECKC
C093,094	ECQM
C097,098	ECQS
C101,102	ECQM
C111,112	ECCC
C601x2,604, 803–806, 819,820	ECEA
C603,845	ECEA
C605	ECEA
C606,807,808	ECEA
C701	ECQV
C702	ECEA
C703	ECEA
C704	ECEA
C705	ECQM
C706	ECEA
C815–818	ECQS
C837–840	ECEA
C841–844	ECAG
C847,848	ECEA
VARIABL	
R005,006	EVLS
R009,010	EVLS
R057,058	EVLS
R079,080	EVLT
R127,128	EVLS
R(601,602)x2	EVKD
R604x2	EVKD
R606x2	EVKD
FILTERS	
F001,002	EULE
F003,004	EULE
F005,006	EULE

REPLACEMENT PARTS LIST

Ref. No.	Part No.	Description	Per Set (PCS.)	Remarks
IC and TRANSISTORS				
IC001,002	SVIQS5022	Demodulator	2	
TR001,002	2SK30AY	Auto highcut	2	
TR003-006	2SC828-RST	Auto highcut	4	
TR007-010	2SC828-RST	Muting	4	
TR011	2SC828-RST	Muting	1	
TR012,013	2SC828-RST	Muting	2	
TR601	2SC828-RST	Meter Amp.	1	
TR701	A2SC1226-PQR	Ripple Filter	1	
TR702	2SA564-QR	Muting	1	
TR703	2SC828-RST	Muting	1	
TR801,802	2SC828-RST-	C.C.C.	2	
TR803,804	2SC828-RST	C.C.C.	2	
TR805,806	2SA564-QR	C.C.C.	2	
TR807,808	2SC828-RST	C.C.C.	2	
TR809,810	2SC828-RST	C.C.C.	2	
TR811,812 815,816	2SC828-RST	C.C.C.	4	
TR813,814	2SC828-RST	C.C.C.	2	
TR817-820	2SC828-RST	C.C.C	4	
TR821,822	2SA564-QR	C.C.C.	2	
TR823,824	2SC828-RST	C.C.C.	2	
DIODES				
D001,002, 005—008 703—707	MA150	Demodulator	11	
D003,004	OA90	Demodulator	2	
D009	MA26-2	Demodulator	1	
D601	OA90	Rectifier	1	
D602	MA26-1	Rectifier	1	
D701	SVDS1RB10	Rectifier	1	
D702	SVDMZ214A	Stabilizer	1	
D801—804	OA90	C.C.C.	4	
D805—808	OA90	C.C.C.	4	
D809—812	MA26-1	C.C.C.	4	
D851	LN23	CD-4 Radar, L.E.D.	1	○
COILS and TRANSFORMER				
L001,002	SLQR104-1K	Choke Coil	2	N
L701	SLQX250-1	Choke Coil	1	
T801	SLT5K43	Power Transformer	1	○
			1	
RESISTORS				
R001,002,017, 018,045,046, 095,096	ERD18TJ153	15KΩ 1/8W ±5% Carbon	8	
R003,004,011— 014,047—052 071,072,097 098,103,113, 114,120	ERD18TJ104	100KΩ 1/8W ±5% Carbon	20	
R007,008,075, 076,105—110	ERD18TJ473	47KΩ 1/8W ±5% Carbon	10	
R015,016,021 022,027,028 065,066	ERD18TJ332	3.3KΩ 1/8W ±5% Carbon	8	
R019,020,845- 848,897	ERD18TJ332	3.3KΩ 1/8W ±5% Carbon	7	
R023,024,043, 044,125,126	ERD18TJ822	8.2KΩ 1/8W ±5% Carbon	6	
R025,026,053, 054	ERD18TJ563	560KΩ 1/8W ±5% Carbon	4	
R029,030,032, 083,084,135, 137,138	ERD18TJ102	1KΩ 1/8W ±5% Carbon	8	
R031	ERD18TJ561	560Ω 1/8W ±5% Carbon	1	
R033,034	ERD18TJ564	560KΩ 1/8W ±5% Carbon	2	
R035	ERD14TJ333	33KΩ 1/4W ±5% Carbon	1	
R036	ERD18TJ333	33KΩ 1/8W ±5% Carbon	1	
R037,038,091, 092,707	ERD18TJ824	820KΩ 1/8W ±5% Carbon	5	
R039,040,129, 130	ERD18TJ682	6.8KΩ 1/8W ±5% Carbon	4	
R041,042	ERD18TJ392	3.9KΩ 1/8W ±5% Carbon	2	
R055,056,073, 074,077,078 141,145,705	ERD18TJ103	10KΩ 1/8W ±5% Carbon	9	
R059,060710	ERD18TJ474	470KΩ 1/8W ±5% Carbon	3	
R061,062,087, 088,123,124	ERD18TJ471	470Ω 1/8W ±5% Carbon	6	
R063,064	ERD18TJ681	680Ω 1/8W ±5% Carbon	2	
R067,068	ERD18TJ680	68Ω 1/8W ±5% Carbon	2	
R069,070	ERD18TJ331	330Ω 1/8W ±5% Carbon	2	
R081,082	ERD14TJ222	2.2KΩ 1/4W ±5% Carbon	2	
R085,086	ERD18TJ394	390KΩ 1/8W ±5% Carbon	2	
R089,090	ERD18TJ683	68KΩ 1/8W ±5% Carbon	2	
R093,094	ERD18TJ221	220Ω 1/8W ±5% Carbon	2	
R101,102	ERD18TJ823	82KΩ 1/8W ±5% Carbon	2	
R111,112	ERD18TJ123	12KΩ 1/8W ±5% Carbon	2	
R115—118	ERD18TJ222	2.2KΩ 1/8W ±5% Carbon	4	
R119	ERD18TJ154	150KΩ 1/8W ±5% Carbon	1	
R121,122	ERD18TJ101	100Ω 1/8W ±5% Carbon	2	
R131,132	ERD18TJ562	5.6KΩ 1/8W ±5% Carbon	2	
R133,134,142 706	ERD18TJ223	22KΩ 1/8W ±5% Carbon	4	
R136,607x2, 809,810,813, 814,833—840 877,878,881, 882,893—896	ERD18TJ102	1KΩ 1/8W ±5% Carbon	23	
R139	ERD18TJ152	1.5KΩ 1/8W ±5% Carbon	1	
R140,708	ERD18TJ224	220KΩ 1/8W ±5% Carbon	2	
R143	ERD18TJ393	39KΩ 1/8W ±5% Carbon	1	
R144	ERD18TJ334	330KΩ 1/8W ±5% Carbon	1	
R151,152,811, 812,853—856 861—864	ERD18TJ472	4.7KΩ 1/8W ±5% Carbon	12	
R603x2	ERD18TJ563	56KΩ 1/8W ±5% Carbon	2	
R605x2,803 804,819,820, 865,866,869, 870,879,880, 883,884	ERD18TJ103	10KΩ 1/8W ±5% Carbon	14	
R608,857,858	ERD18TJ122	1.2KΩ 1/8W ±5% Carbon	3	
R609	ERD18TJ152	1.5KΩ 1/8W ±5% Carbon	1	
R610	ERD18TJ561	560Ω 1/8W ±5% Carbon	1	
R611,831,832, 867,868,871, 872	ERD18TJ683	68KΩ 1/8W ±5% Carbon	7	
R612,849,850, 873—876, 887—890	ERD18TJ104	100KΩ 1/8W ±5% Carbon	11	
R613	ERD18TJ222	2.2KΩ 1/8W ±5% Carbon	1	
R701	ERX1ANJ3R9	3.9Ω 1W ±5% Metallic Film	1	
R702	ERD14TJ221	220Ω 1/4W ±5% Carbon	1	
R703	ERD18TJ561	560Ω 1/8W ±5% Carbon	1	
R704	ERD18TJ151	150Ω 1/8W ±5% Carbon	1	
R709	ERD18TJ122	1.2KΩ 1/8W ±5% Carbon	1	
R801,802,851, 852,901	ERD18TJ222	2.2KΩ 1/8W ±5% Carbon	5	
R805,806,829, 830	ERD18TJ333	33KΩ 1/8W ±5% Carbon	4	
R807,808	ERD18TJ334	330KΩ 1/8W ±5% Carbon	2	
R815,816,859, 860	ERD18TJ681	680Ω 1/8W ±5% Carbon	4	
R817, 818	ERD18TJ272	2.7KΩ 1/8W ±5% Carbon	2	
R821,822,841 842	ERD18TJ223	22KΩ 1/8W ±5% Carbon	4	
R823—828	ERD18TJ123	12KΩ 1/8W ±5% Carbon	6	
R843,844	ERD18TJ183	18KΩ 1/8W ±5% Carbon	2	
R885,886,891 892	ERD18TJ393	39KΩ 1/8W ±5% Carbon	4	
R903,904	ERD18TJ473	47KΩ 1/8W ±5% Carbon	2	
CAPACITORS				
C001,002,045, 046,109,110	ECQM05682KZ	0.0068μF 50V ±10% Polyester	6	
C003,004,075 076	ECEA6V100LF	100μF 6V ±10% Electrolytic	4	
C005,006,025 026,073,074 077—079, 091,095,096	ECEA16V10LF	10μF 16V Electrolytic	12	
C007—010,013, 014,019—024 035,036,039, 040,051,052 061,062,067- 070,088,089, 090,104,707	ECEA50V1LF	1μF 50V Electrolytic	28	
C015,016,081 082	ECQM05222KZ	0.0022μF 50V ±10% Polyester	4	
C017,018,033 034	ECAG25ER47LF	0.47μF 25V Electrolytic	4	
C020	ECEA50N1	1μF 50V Electrolytic	1	
C027	ECEA6V47LF	47μF 6V Electrolytic	1	
C029,030	ECCC1H101K	100 pF 50V ±10% Ceramic	2	
C031,032,083, 084,106	ECQM05332KZ	0.0033μF 50V ±10% Polyester	5	
C037,038,105 107,108	ECQM05472KZ	0.0047μF 50V ±10% Polyester	5	
C041,042,047, 048	ECQM05683KZ	0.068μF 50V ±10% Polyester	4	
C043,044, 602x2,801, 802,813,814 829—832	ECQM05473KZ	0.047μF 50V ±10% Polyester	12	
C049,050,055— 058,809—812 821—828, 833—836	ECQM05103KZ	0.01μF 50V ±10% Polyester	22	
C053,054	ECCC1H220K	22 pF 50V ±10% Ceramic	2	
C059,103	ECEA16V47LF	47μF 16V Electrolytic	2	
C063,064	ECEA10V47LF	47μF 10V Electrolytic	2	
C071,072	ECCC1H221K	220pF 50V ±10% Ceramic	2	
C085,086	ECKC1H681K	680 pF 50V ±10% Ceramic	2	
C093,094	ECQM05333KZ	0.33μF 50V ±10% Polyester	2	
C097,098	ECQS1272KZ	2700 pF 50V ±10% Polyethylene	2	
C101,102	ECQM05223KZ	.022μF 50V ±10% Polyester	2	
C111,112	ECCC1H330K	33 pF 50V ±10% Ceramic	2	
C601x2,604, 803—806, 819,820	ECEA50V1L	1μF 50V ±10% Electrolytic	9	
C603,845	ECEA10V47L	47μF 10V Electrolytic	2	
C605	ECEA6V100L	100μF 6V Electrolytic	1	
C606,807,808	ECEA25V4R7L	4.7μF 25V Electrolytic	3	
C701	ECQW8A103M	0.01μF 800V ±20% Polyester	1	
C702	ECEA25V1000L	1000μF 25V Electrolytic	1	
C703	ECEA25V100L	100μF 25V Electrolytic	1	
C704	ECEA16V220L	220μF 16V Electrolytic	1	
C705	ECQM05683KZ	.068μF 50V ±20% Polyester	1	
C706	ECEA16V470LF	470μF 16V Electrolytic	1	
C815—818	ECQS1222KZ	2200 pF 50V ±10% Polyethylene	4	
C837—840	ECEA16V10L	10μF 16V Electrolytic	4	
C841—844	ECAG25ER47L	0.47μF 25V Electrolytic	4	
C847,848	ECEA25V3R3L	3.3μF 25V Electrolytic	2	
VARIABLE RESISTORS				
R005,006	EVLS3AA00B16	1MΩ (B) ANRS (Mid)	2	○
R009,010	EVLS3AA00B16	1MΩ (B) ANRS (High)	2	○
R057,058	EVLS3AA00B53	5KΩ (B) Auto high cut	2	
R079,080	EVLT8AA00B23	2KΩ (B) Rock rang	2	○
R127,128	EVLS3AA00B53	5KΩ (B) Vco	2	
R(601,602)x2	EVKDE3P17A24	20KΩ (A) C.C.C. Volume With S6	2	K ○
R604x2	EVKDD3P17C53	5KΩ (C) Separation Volume With S7	2	K ○
R606x2	EVKDD3P17B15	100KΩ (B) Carrier Volume With S8	2	K ○
FILTERS				
F001,002	EULBPF204	L.P.F.	2	○
F003,004	EULBPF202	B.P.F.	2	○
F005,006	EULBPF203	B.P.F	2	○

Ref. No.	Part No.	Description	Per Set (PCS.)	Remarks
SWITCHES				
S1	SSL3S	Power Switch	1	○
S2,	SSLA26-1S	Mode Switch (Dimodu Direct)	1	○
S3	SSLA25-1S	Mode Switch (4ch 2ch)	1	○
S4	SSL1S	Cartridge Selector Switch	1	○
S5	SSLA26-1S	High Blend Switch	1	○
S	SSP21-1	Voltage Ajustor Switch (for PX)	1	○
CHASSIS PARTS				
CH1	XAM35K	Meter Light	1	
CH2	SSM53	Meter (for MESE)	1	○
CH2	SSM55	Meter	1	
CH3	SJA33	AC Cord	1	
CH3	SJA63	AC Cord (for England)	1	
CH3	SJA59	AC Cord (for Holland)	1	
CH4	SJS9205-1	AC Outlet	1	
CH5	SJFA3401	4P Pin Socket	1	
CH6	SJF3415	4P Pin Socket	1	○
CH7	RJV1A	Lamp Socket	1	
CH8	SNEA404	Earth Terminal	1	
CH9	SNEA204-28		1	
CH10	SNTA421		1	
CH11	SMP229	Lamp Holder	1	○
CH12	SHG1269	Rubber, CD-4 Radar	1	○
CH13	SHG1189-1	Rubber, P.T.	1	
CH14	SHG1167	Rubber, P.C.B.	1	
CH15	SHR9201	Moltplane, Meter	1	○
CH16	SHR301	Lead Clamper	5	
CH17	RHR111	Cord Bushing	1	
CH18	SJS5307	Lead Socket	1	
CH19	SJS5505			
CH20	SJS41			
CH21	RJT204A	Lead Terminal	1	
CH22	SJS17			
CH23	XTV3+8C	Tapping Screw	6	
CABINET PARTS				
CA1	SKM1451	Cabinet (Metal)	1	○
CA2	SKU4830	Bottom Plate	1	○
CA3	SYE377-1	Control Panel (for MESE)	1	○
CA3	SYE377-2	Control Panel	1	
CA4	SBLA3	Knob (Lever Switch)	5	○
CA5	SBN519-1K	Knob (Volume)	6	K ○
CA6	SHR9105	Moltplane, Cabinet	1	
CA7	SHR9211	Moltplane, Cabinet	1	○
CA8	SHGA929	Leg	4	○
CA9	XTV3+8C	Tapping Screw, Panel Bottom Plate	6	
CA10	XTV3+12C	Tapping Screw,	4	
CA11	XTS3+8CFVC	Screw, Panel	2	
CA12	XSB4+6FZS	Screw, Cabinet	4	
PACKING PARTS				
PA1	SPG481	Outside Packing Case (for MESE)	1	○
PA2	SPN4913	Inside Packing Case (for MESE)	1	○
PA2	SPN4913-1	Inside Packing Case	1	○
PA3	SPN4943	Corner Pad	4	○
PA4	SPN4947	Rear Pad	2	○
PA5	SPN4949	Front Pad	2	○
PA6	SPN4951	Carton, Spacer	1	○
PA7	SPN4953	Bottom Pad	1	
PA8	SPP273	Polyethylene Bag	1	
PA9	SPB1045	Polyethylene Bag	1	
ACCESSORIES				
AC1	SQF887	Printed Matter	1	○
AC1	SQF913	Printed Matter (for MESE)	1	○
AC2	SPR123	Record	1	○